Volunteer Lake Assessment Program Individual Lake Reports

LOON POND, GILMANTON, NH

MORPHOMETRIC DATA

Watershed Area (Ac.):	1,088	**Max. Depth (m):**	13.6	**Flushing Rate (yr^{1})**	0.6
Surface Area (Ac.):	121	**Mean Depth (m):**	7	**P Retention Coef:**	0.69
Shore Length (m):	3,100	**Volume (m^{3}):**	3,436,000	**Elevation (ft):**	904

TROPHIC CLASSIFICATION

Year	Trophic class
1980	MESOTROPHIC
1996	MESOTROPHIC

KNOWN EXOTIC SPECIES

The Waterbody Report Card tables are generated from the DRAFT 2014 305(b) report on the status of N.H. waters, and are based on data collected from 2004-2013. Detailed waterbody assessment and report card information can be found at www.des.nh.gov/organizations/divisions/water/wmb/swqa/index.htm

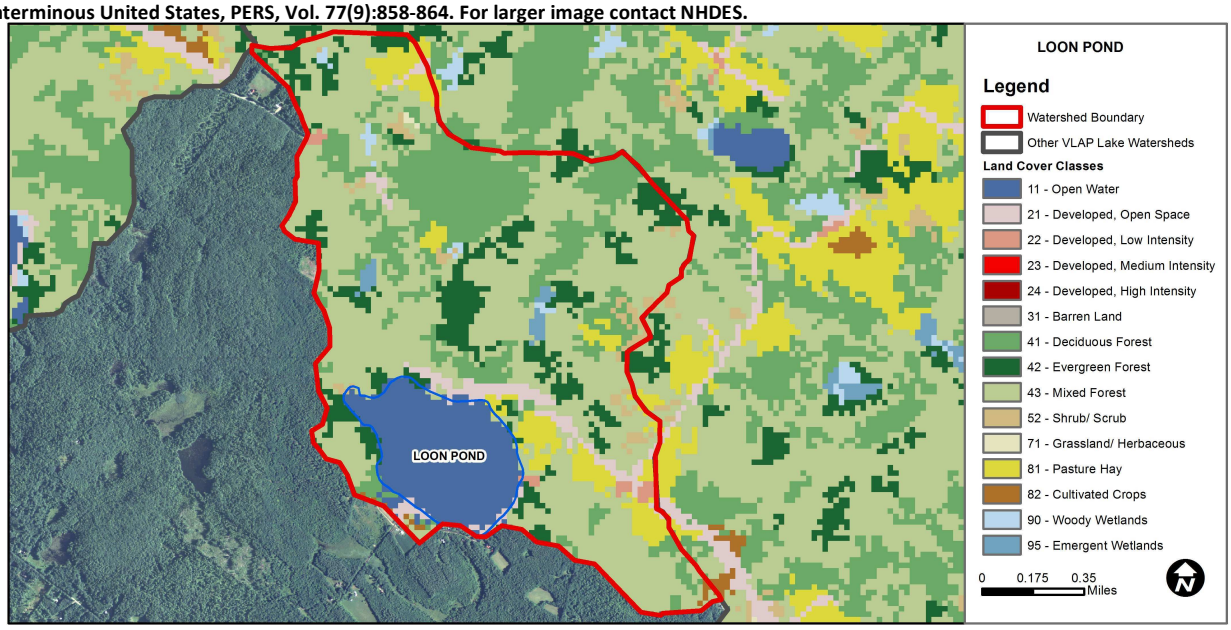
Designated Use	Parameter	Category	Comments
Aquatic Life	Phosphorus (Total)	Good	The calculated median is from 5 or more samples and is < indicator and > 1/2 indicator and the chlorophyll a indicator is okay.
	pH	Slightly Bad	>10% of samples exceed criteria by a small margin (minimum of 2 exceedances).
	Oxygen, Dissolved	Encouraging	There are < 10 samples with 0 exceedances of criteria. More data needed.
	Dissolved oxygen satura	Encouraging	There are < 10 samples with 0 exceedances of criteria. More data needed.
	Chlorophyll-a	Very Good	The calculated median is from 5 or more samples and is <= 1/2 indicator.
Primary Contact Recreation	Escherichia coli	No Data	No data for this parameter.
	Chlorophyll-a	Very Good	There are a total of at least 10 samples with 0 exceedances of indicator.

BEACH PRIMARY CONTACT ASSESSMENT STATUS

LOON LAKE - LOON LAKE BEACH	Escherichia coli	Very Good	Where there are no geometric means, all bacteria samples are < 75% of the geometric mean. Where there are geometric means all single bacteria samples are < the SSMC and all geometric means are < geometric mean criteria.

WATERSHED LAND USE SUMMARY

Fry, J., Xian, G., Jin, S., Dewitz, J., Homer, C., Yang, L., Barnes, C., Herold, N., and Wickham, J., 2011. Completion of the 2006 National Land Cover Database for the Conterminous United States, PERS, Vol. 77(9):858-864. For larger image contact NHDES.



Land Cover Category	% Cover	Land Cover Category	% Cover	Land Cover Category	% Cover
Open Water	11.2	Barren Land	0	Grassland/Herbaceous	0.08
Developed-Open Space	3.24	Deciduous Forest	18.53	Pasture Hay	5.41
Developed-Low Intensity	0.6	Evergreen Forest	10.82	Cultivated Crops	0.31
Developed-Medium Intensity	0	Mixed Forest	47	Woody Wetlands	0.5
Developed-High Intensity	0	Shrub-Scrub	1.65	Emergent Wetlands	0.74

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2015 Data Summary

Recommended Actions: Conductivity and chloride levels in Bertrand Bk. and Gardner Cove Inlet were elevated in 2015. Elevated chloride levels indicate current and historical road salting practices have impacted the tributaries, particularly in dry weather conditions where groundwater or wetlands may contribute to elevated levels. Work with local road agents and contractors to minimize sand/salt application near surface waters. Encourage local road agent and contractors to obtain a Voluntary N.H. Salt Applicator license through UNH's Technology Transfer Center's Green SnowPro certification program and to calibrate spreaders to prevent the over-application of sand/salt mixtures. Encourage road agent to remove sand/salt build-up along the roadsides in spring to prevent this from washing into the tributaries and lake during storm events. The worsening Epilimnetic and Hypolimnetic phosphorus trends are concerning particularly since Bertrand and Varney Bk. tributary phosphorus levels have remained at lower levels since 2011. This could indicate potential groundwater phosphorus inputs from septic systems or phosphorus inputs from lake front properties through stormwater runoff. Educate lake residents on septic system maintenance and inspection, maintaining vegetated buffers along the shoreline and utilizing phosphorus free fertilizers if necessary. Stormwater runoff can carry excess nutrients into tributaries and lakes. Utilize DES' N.H. Homeowner's Guide to Stormwater Management to install stormwater best practices on lake front properties. Keep up the great work!

Observations (*Refer to Table 1 and Historical Deep Spot Data Graphics)*

- **Chlorophyll-a:** Chlorophyll levels were stable and low from June to July and average chlorophyll levels were less than the state median. Historical trend analysis indicates stable chlorophyll levels since monitoring began.
- **Conductivity/Chloride:** Conductivity levels at all stations increased in 2015 likely due to the above average snowfall the prior winter and the dry summer weather conditions. Deep spot, Gardner Cove Inlet and Outlet conductivity levels continue to be slightly elevated and greater than the state median. Historical trend analysis indicates relatively stable epilimnetic conductivity with high variability between years. Bertrand Bk. conductivity and chloride levels were low in June and then increased to elevated levels in July. Stream flow was noted as low and groundwater inputs to the stream may influence conductivity and chloride during dry conditions with low flows due to historical road salting practices. Varney Bk. conductivity and chloride levels remained approximately equal to the state medians. Epilimnetic chloride levels were slightly greater than the state median and greater than what we would expect in un-disturbed surface waters. Gardner Cove Inlet chloride levels were elevated and much greater than the state median however were less than state standard for chronic chloride conditions.
- **Total Phosphorus:** Epilimnetic (upper water layer) phosphorus decreased from June to July and average phosphorus levels were less than the state median and improved slightly from 2014. However, historical trend analysis indicates significantly increasing (worsening) epilimnetic phosphorus since monitoring began, particularly since 2003. Metalimnetic (middle water layer) phosphorus was slightly elevated in June and then decreased to low levels in July. Hypolimnetic (lower water layer) phosphorus levels were stable and low from June to July, however historical trend analysis indicates significantly increasing (worsening) hypolimnetic phosphorus levels as well. Bertrand Bk. and Gardner Cove Inlet phosphorus levels were average in June and increased to slightly elevated levels in July during low flow conditions. Outlet phosphorus levels were stable and low, and Varney Bk. phosphorus levels were average.
- **Transparency:** Transparency was good in June and decreased slightly in July. Average transparency remained stable with 2014 and was better than the state median. Historical trend analysis indicates relatively stable transparency with moderate variability between years. Transparency measured with the viewscope (VS) was better than that measured without (NVS) and likely a better representation of actual conditions.
- **Turbidity:** Epilimnetic and Outlet turbidity was low. Metalimnetic turbidity was slightly above average in June and July likely due to algal growth. Hypolimnetic turbidity was slightly elevated in June and decreased to average levels in July. Bertrand and Varney Bk. turbidities were slightly elevated in June potentially due to a storm event prior to sampling and then decreased to average levels in July. Gardner Cove Inlet turbidity was average in June and the increased to slightly elevated levels in July potentially due to low flow conditions.
- **pH:** Epilimnetic and metalimnetic pH levels were within the desirable range 6.5-8.0 units. Historical trend analysis indicates relatively stable epilimnetic pH with moderate variability between years. Hypolimnetic pH was slightly less than desirable and tributary pH levels were all within the desirable range.

Station Name	Table 1. 2015 Average Water Quality Data for LOON POND								
	Alk. mg/l	Chlor-a ug/l	Chloride mg/l	Cond. uS/cm	Total P ug/l	Trans. m		Turb. ntu	pH
						NVS	VS		
Epilimnion	7.7	2.60	21	114.1	8	4.92	5.37	0.72	6.99
Metalimnion				104.0	12			1.42	6.83
Hypolimnion				103.3	11			1.99	6.43
Bertrand Brook			32	144.0	20			1.63	6.75
Gardner Cove Inlet			69	265.0	19			1.83	6.54
Outlet In Stream				102.3	8			0.71	6.82
Varney Brook			8	58.2	20			2.08	6.73

NH Water Quality Standards: Numeric criteria for specific parameters. Results exceeding criteria are considered a water quality violation.
Chloride: > 230 mg/L (chronic)
E. coli: > 88 cts/100 mL – public beach
E. coli: > 406 cts/100 mL – surface waters
Turbidity: > 10 NTU above natural level
pH: between 6.5-8.0 (unless naturally occurring)

NH Median Values: Median values for specific parameters generated from historic lake monitoring data.
Alkalinity: 4.9 mg/L
Chlorophyll-a: 4.58 mg/m^3
Conductivity: 40.0 uS/cm
Chloride: 4 mg/L
Total Phosphorus: 12 ug/L
Transparency: 3.2 m
pH: 6.6

Historical Water Quality Trend Analysis

Parameter	Trend	Explanation	Parameter	Trend	Explanation
Conductivity	Stable	Trend not significant; data highly variable.	Chlorophyll-a	Stable	Trend not significant; data show low variability.
pH (epilimnion)	Stable	Trend not significant; data moderately variable.	Transparency	Stable	Trend not significant; data moderately variable.
			Phosphorus (epilimnion)	Worsening	Data significantly increasing.